UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,153	09/20/2005	Toshikazu Okubo	38915.00045	1053

44955 7590 01/05/2009

SQUIRE, SANDERS & DEMPSEY L.L.P.
1 MARITIME PLAZA, SUITE 300
SAN FRANCISCO, CA 94111

EXAMINER	
NGUYEN, KHIEM D	

ART UNIT	PAPER NUMBER
2823	

MAIL DATE	DELIVERY MODE
01/05/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,153	OKUBO ET AL.	
	Examiner	Art Unit	
	KHIEM D. NGUYEN	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) *1-4, 6-10, 12-16, 18, 19 and 21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5,11,17,20 and 22-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remarks

1. Applicants' argument, see Remarks on Page 10 of the response filed on September 17th, 2008 with respect to the rejection of claims 5, 11, 17 and 20 under 35 U.S.C. 102(b) have been fully considered and are persuasive. Therefore, the non-final rejection as set forth in Paper No. 20080630 mailed on July 03rd, 2008 has been withdrawn. However, upon further consideration, a new ground of rejection is made in view of newly discovered reference to Basol (U.S. Patent 6,921,551).

Claim Objections

2. Claim 22 is objected to because of the following informalities: In claim 22, line 2, replace "claim5" with --claim 5--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 5, 11, 17, 20 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Basol (U.S. Patent 6,921,551).

In re claim 5, **Basol** discloses an apparatus for analyzing the fillability with a copper electroplating solution, which comprises using a method for analyzing a copper electroplating solution containing an additive (an accelerator and a

suppressor) (see col. 11, line 35 to col. 12, line 41), which comprises determining the time-dependent potential change at a cathode current density to thereby judge the fillability with the copper electroplating solution (see col. 12, line 42 to col. 15, line 9 and FIGS. 6a-e and 7).

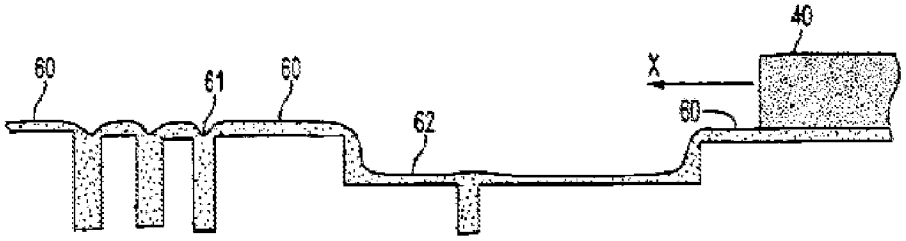

FIG. 6a

Basol do not specifically disclose determining the time-dependent potential change at a cathode current density of 0.1-20 A/dm^2.

However, there is no evidence indicating the cathode current density range is critical and it has been held that it is not inventive to discover the optimum or workable range of a result-effective variable within given prior art conditions by routine experimentation. See MPEP § 2144.05. Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

In re claim 11, **Basol** discloses an apparatus for analyzing the fillability with a copper electroplating solution, which comprises using a method for

analyzing a copper electroplating solution used in copper electroplating for filling a copper metal in a via-hole or a trench **61, 62** installed in a semiconductor product, which comprises using an electrochemical ceil composed of a working electrode (rotary electrode), a reference electrode and a copper electrode (counter electrode) for a copper electroplating solution (see col. 11, line 35 to col. 12, line 41 and FIG. 6a), electrolyzing the solution with the working electrode (rotary electrode) as a cathode so as to make the cathode current density controlled in a predetermined range, determining the time-dependent potential change between the cathode and the reference electrode for a predetermined period of time after the start of the electrolysis, and judging the fillability with the copper electroplating solution from the time-dependent change curve profile (see col. 12, line 42 to col. 15, line 9 and FIGS. 6a-e and 7).

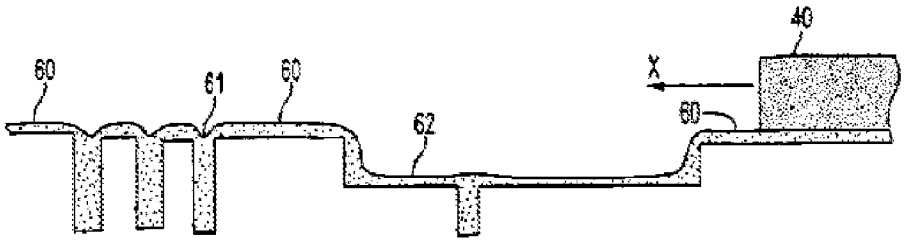

FIG. 6a

Basol do not specifically disclose that the cathode current density controlled in the range of 0.1-20 A/dm^2.

However, there is no evidence indicating the cathode current density range is critical and it has been held that it is not inventive to discover the optimum or workable range of a result-effective variable within given prior art conditions by routine experimentation. See MPEP § 2144.05. Note that the

specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

In re claim 17, **Basol** discloses an apparatus for analyzing the fillabillity with a copper electroplating solution, which comprises using a method for analyzing a copper electroplating solution containing an additive (see col. 11, line 35 to col. 12, line 41), which comprises using an electrochemical cell composed of a working electrode. (rotary electrode), a reference electrode and a copper electrode (counter electrode) for a copper electroplating solution, electrolyzing the solution with the working electrode (rotary electrode) as a cathode so as to make the cathode current density controlled in a predetermined range, and determining the time-dependent potential change for a predetermined period of time after the start of the electrolysis to thereby judge the uniformity of electrodeposition (film properties and film thickness uniformity) with the solution (see col. 12, lie 42 to col. 15, line 9 and FIGS. 6a-e and 7).

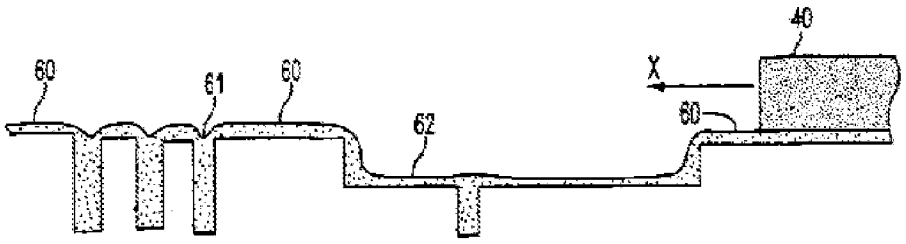

FIG. 6a

Basol do not specifically disclose that the cathode current density controlled in the range of 0.1-20 A/dm^2.

However, there is no evidence indicating the cathode current density range is critical and it has been held that it is not inventive to discover the optimum or workable range of a result-effective variable within given prior art conditions by routine experimentation. See MPEP *§* 2144.05. Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

In re claim 20, **Basol** discloses an apparatus for analyzing the fillability with a copper electroplating solution, which comprises using a method for analyzing a copper electroplating solution used in copper electroplating for filling a copper metal in a via-hole or a trench **61, 62** installed in a semiconductor product, which comprises using an electrochemical cell composed of a working electrode (rotary electrode), a reference electrode and a copper electrode (counter electrode) for a copper electroplating solution (see col. 11, line 35 to col. 12, line 41 and FIG. 6a), electrolyzing the solution with the working electrode (rotary electrode) as a cathode so as to make the cathode current density controlled in a predetermined range, controlling the rotation of the working

electrode (rotary electrode) in two stages falling within a range of 0-7500 rpm, determining the time-dependent potential change between the cathode and the reference electrode at different rotations, and comparing the time-dependent change curves with each other to thereby judge the fillability with the copper electroplating solution (see col. 12, line 42 to col. 15, line 9 and FIGS. 6a-e and 7).

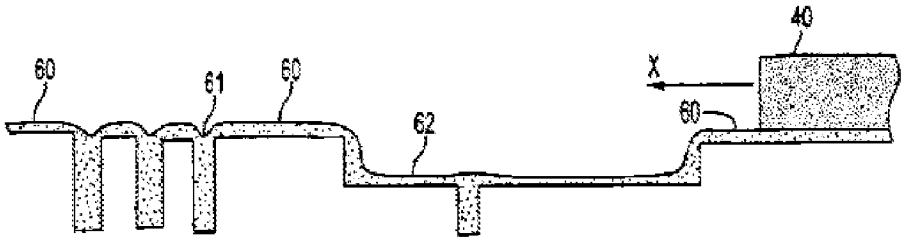

FIG. 6a

Basol do not specifically disclose that the cathode current density controlled in the range of 0.1-20 A/dm^2.

However, there is no evidence indicating the cathode current density range is critical and it has been held that it is not inventive to discover the optimum or workable range of a result-effective variable within given prior art conditions by routine experimentation. See MPEP § 2144.05. Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

In re claims 22-25, as applied to claims 5, 11, 17 and 20 above, respectively, **Basol** discloses all claimed limitations including the limitation wherein the fillability is judged by approximating the time-dependent potential change curve for a predetermined period of time after the start of the electrolysis, according to the Boltzmann's function represented by the following numerical formula (1), to thereby obtain the potential change speed dx (see col. 12, line 42 to col. 15, line 9 and FIGS.6a-e and 7):

$$y = \frac{A_1 - A_2}{1 + e^{\frac{x - x_0}{dx}}} + A_2 \quad (1)$$

Response to Applicants' Amendment and Arguments

5. Applicants' arguments with respect to claims 5, 11, 17, 20 and 22-25 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHIEM D. NGUYEN whose telephone number is (571)272-1865. The examiner can normally be reached on Monday-Friday (8:30 AM - 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Khiem D. Nguyen/
Examiner, Art Unit 2823

/K. D. N./
December 31st, 2008